# Conserving South Carolina's At-Risk Species:

## *Species facing threats to their survival*

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### Carolina hemlock

(*Tsuga caroliniana*)


### Description

Carolina hemlocks are slow-growing evergreen trees usually 12 - 21 meters tall with scaly, reddish-brown bark on young twigs and dark, deeply furrowed ridges on older trunks. Their branches are horizontal or drooping in flattened sprays. Needles are 1 - 2 cm long, flat, bristling in all directions from the twigs, shiny green above with two narrow white lines beneath, borne singly on tiny woody "pegs." The trees begin to produce cones at about 20 years, with peak production beginning at 25 - 30 years. Pollen cones, less than 0.5 cm long, occur singly in the angles between needles and twigs and consist of numerous anthers. Seed cones, 2.5 - 4 cm long, are initially light green and erect, are also solitary, and develop at the tips of twigs in March and April. After fertilization which occurs in the spring, the seed cones take two growing seasons to mature. Seeds ripen in late summer of the second year after fertilization and are released during the following fall and winter. The winged seeds are dispersed by wind and the empty cones persist on the twigs until the following spring, after seeds are released.

### Range

Carolina hemlocks are known from the Appalachian Mountains of Georgia, South Carolina, North Carolina, Tennessee, and Virginia. In South Carolina, it occurs in Greenville, Oconee, and Pickens counties.

### Habitat

Carolina hemlocks occur in a variety of landscapes ranging from xeric ridgelines to gorges in the Southern Blue Ridge Mountains. These occurrences are mostly on cliffs, rocky slopes and ridges; less commonly on gentle slopes and flat areas in valleys. Soils are usually nutrient-poor and rocky. Carolina hemlocks are very shade tolerant and are often associated with the following species: *Tsuga canadensis* (eastern hemlock), *Quercus prinus* (chestnut oak), *Quercus rubra* (northern red oak), *Pinus rigida* (pitch pine), *Pinus virginiana* (Virginia pine), and *Pinus pungens* (Table Mountain pine).

### Status

NatureServe's Rounded Global Status is G3 - Vulnerable. The U.S. Fish and Wildlife Service was petitioned to list the species in April 2010 and in September 2011, published a substantial 90-day finding indicating listing may be warranted.

### Threats

A serious threat to Carolina hemlocks is the Hemlock woolly adelgid, an exotic pest that was accidentally introduced from Asia. It was first reported in the Pacific Northwest in the mid-1920s, and in the eastern U.S. by the mid-1950s. The adelgid has spread throughout the Appalachians from New England south to South Carolina and Georgia and west into Kentucky. It attacks and kills both Carolina and Canada hemlocks. Another threat is clearing and logging in Carolina hemlock habitat. Carolina hemlocks are also not fire tolerant as seedlings and saplings are killed by fire. With limited range, the species' habitat is also limited.

### Management/Protection Needs

Recommendations are to apply adelgid control measures and to support research on eradicating Hemlock woolly adelgid. Additionally, efforts to preserve genetic material of the Carolina hemlock should be supported. Avoid logging and clearing on mountain slopes and in high-elevation habitats.

### References

Clemson University: http://www.clemson.edu/extension/publications/entomology/new-imported/hemlock-woolly-adelgid-ni04.html

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